RICHARD B. OGILVIE
Governor

STATE OF ILLINOIS

WILLIAM L. BLAZER
DIRECTOR

ENVIRONMENTAL PROTECTION AGENCY

June 7, 1972

IN REPLY REFER TO:
COOK COUNTY - Land Pollution Control
Arlington Heights/Municipal

Village of Arlington Heights
33 South Arlington Heights Road
Arlington Heights, Illinois 60005

ATTENTION: Gene Willroth
Director of Public Works

Gentlemen:

This will acknowledge receipt of your Application for Permit to modify and operate a solid waste disposal site, dated May 2, 1972 and received by this Agency on May 3, 1972.

A review of the Application has been completed and the following comments are made pursuant to that review:

The Agency is concerned about the fate of leachate that will be produced by water percolating through the refuse. If it is assumed that the density of the compacted refuse is 1000 lb./cu. yd., then approximately 1.455 billion pounds of refuse will eventually be deposited at the site. If it is further assumed that about 50 pounds of dissolved solids are leached from a ton of refuse, approximately 36 million pounds or 18,000 tons of dissolved solids will be leached from the refuse at the site. A considerable proportion of the dissolved solids contained in the leachate will remain in solution and thus pose a serious threat to the quality of the ground water in the vicinity of the landfill.

The borehole and well water levels indicate that the leachate will migrate horizontally and possibly vertically downward from the landfill. Based on a water level contour map of the water levels in the boreholes, it appears that the leachate will migrate primarily in a radial manner from the landfill at some time during or after the development of the site. In addition, a geologic log for a well drilled in 1940 which was located 200 feet south of Dundee Road and 1/2 mile west of State Road in Section 7, T. 42N., R. 11E. indicates that the static water level for the 26 foot thick sand and gravel aquifer over-

lying the bedrock was at an elevation of 687 feet or about 35 feet below the land surface. In the area of the landfill the static water levels are generally located much closer to the land surface. Consequently, it is assumed that a downward directed vertical hydraulic gradient exists. Thus, a ground-water monitoring program will have to monitor the water quality around the entire perimeter of the landfill and possibly beneath the landfill itself.

The potential for polluting ground water can be significantly reduced by installing a leachate collection system. The leachate collection system for each trench could consist of a perforated pipe laid along the trench bottom. A sand or gravel blanket about 6 inches thick on the trench bottom would help to convey the leachate to the collector with a low head loss. A low water table within the refuse would result. If lenses of sand and gravel are encountered on the trench bottom, or if the natural materials are not sufficiently impervious to contain a large portion of the leachate, a clay blanket should be placed over the permeable materials to minimize the quantity of water entering or leaving through the trench bottom. Lenses of sand and gravel outcropping on the trench walls should be sealed as indicated in exhibit D.

Ideally, the base of the trenches should be located well below the water table. If the fluid potential around the inside periphery of the trenches can be maintained at a lower fluid potential than the ground water in the soil surrounding the trenches, the ground water will continually flow towards the trenches. If the flow of ground water towards the trenches could be maintained throughout the period of time required for the leachate to become innocuous, no ground-water pollution could occur as a result of leachate seeping from the trenches.

Once the landfill has been completed, the quantity of ground-water recharge will be substantially reduced. Since clay lined trenches will be used where the soil is relatively permeable, the quantity of recharge reaching the ground-water reservoir under the site will be small. Initially, some of the precipitation entering the refuse through the final cover will be used to increase the moisture content of the refuse and the remainder will be removed by the tile drain system. Thus, the precipitation that recharged the ground-water reservoir prior to constructing the landfill would be prevented from recharging the ground water reservoir after the landfill has been constructed. Immediately after the construction of a trench, the underlying potentiometric surface will decline rapidly because of the low storage coefficient and because the ground water will be removed by both the tile drain system and the ground-water flow system. When the fluid potential of the ground water in the soil surrounding the trenches declines below the fluid potential of the leachate around the periphery of the trench, some leachate will leak from the landfill into the ground water. Once the hydraulic gradient is directed away from the trenches, leachate will migrate away from the trenches and

a significant potential for ground-water pollution would exist. Thus, even though the site can be designed to contain essentially all of the leachate initially, the percolation of leachate from the landfill into the surrounding ground water will eventually occur because of the reduced ground-water recharge in the vicinity of the landfill.

The quantity of contaminants reaching the ground water can be significantly reduced by allowing a large quantity of precipitation to percolate through the refuse. This condition can be achieved by using a permeable material such as sand or gravel for daily and final covers. An efficient leachate collection system would of course be necessary. By passing large quantities of water through the refuse, rapid stabilization of the refuse would occur and the leachate would contain relatively low total dissolved solids. If the leachate contains relatively low total dissolved solids and the loss of leachate from the landfill does not increase because of the increased rate of water movement through the refuse, the quantity of dissolved salts entering the ground-water flow system will be substantially reduced. The resulting ground-water pollution potential will be further reduced since the refuse will become stabilized in a relatively short period of time. Once the landfill has become stabilized and the leachate becomes relatively innocuous, a final cover of low permeability soil could be placed over the gravel cover, if so desired. Even with a gravel cover, several decades will probably be required before the refuse becomes completely stabilized. If the quantity of water percolating through the refuse can be maximized without significantly increasing the loss of leachate from the trenches, ground-water pollution and the time required for stabilization of the refuse will be minimized.

To approximately qualify the ground-water pollution potential of the proposed landfill, additional information will be required. Enclosed are the most recent set of instructions and application forms. These are enclosed only to clarify the hydrologic and geologic information that is generally required to allow a quantitative evaluation of a proposed landfill. They need not be filled out and submitted. The items of particular importance that should have additional information submitted are listed below:

1. The type of cover material to be used and the annual amount of water expected to percolate through the final cover into the refuse should be indicated.

2. The expected use of the site after the landfill operation has been completed should be indicated since the use of the site can significantly affect the amount of water entering the refuse through the final cover.

3. The height of the water table within the refuse above a typical trench floor should be indicated. The refuse would probably have a permeability of about 10^{-3} cm./sec.

4. In order to assess the rate of leakage of leachate from the landfill, the vertical coefficient of permeability of the fine grained material immediately underlying the landfill trenches should be evaluated.

5. An annual water budget should be calculated for the case where the water table has declined below the trench bottoms. The water budget should indicate the quantity of precipitation entering the refuse, the loss of leachate from the trenches by seepage through the sides and bottoms, and the discharge of leachate from the tile drains.

6. The method to be used for the disposal of the collected leachate should be indicated. Either sanitary sewers, or oxidation and/or reduction ponds could be used. If ponds are used to treat the leachate, where will the leachate be discharged?

7. The location and depth of ground-water quality monitoring wells should be indicated. These wells should be designed to monitor the ground-water quality near the existing and the proposed landfills. Upon review by the Agency of the proposed well sites, and depth intervals to be screened, it is a common practice to make the completion of the monitoring wells a condition of the permit. Details on the monitor well construction and method of installation should be submitted to the Agency upon completion. The monitor wells should be constructed using nonmetallic materials and should have a 2 inch I.D standpipe. The wells should be grouted along the entire length of the standpipe to prevent the movement of water down the annular space around the standpipe. Background water quality analyses will have to be conducted on water samples to be obtained from the monitoring wells.

8. Since several water mains and sewers are located near the landfill, the expected effect of any leachate in the ground water on the rate of corrosion of the mains and sewers should be indicated.

9. The A.S.T.M. specifications for the underdrain piping should be indicated along with a map showing the location of drains, if used. What is the maximum expected loading on the tile drains and how will the drains be protected from equipment operating on the site?

10. A program for monitoring the hydraulic characteristics of tile drains should be outlined. Breathers should be installed on the drains to facilitiate the addition of chemical solutions into the drains to remove any materials blocking the drains. Mechanical devices could also be used to clear a blocked drain.

11. Details for a leachate pumping station if used should be submitted.

12. The depth of the final cover that will be placed over the present landfill should be indicated.

13. What is the approximate volume of refuse that has been deposited in the landfill to date?

14. In general, what remedial measures will be taken if leachate seeps develop around the landfill or if serious ground-water pollution occurs.

15. The Illinois State Geological Survey has no record of a shallow well at the southeast edge of the property. If a copy of this log is available it should be sent to the Agency.

16. Two copies of the Report of Soil Investigation No. 1170 dated November 29, 1967 by the Illinois Drilling and Testing Company should be submitted.

17. A cross section through the proposed landfill should be submitted.

18. All data should be submitted in duplicate. Please submit additional copies of exhibits D & E.

19. What are the future plans for the Municipal Services Area and how will these plans modify the existing hydrology?

Based upon the above conditions this Agency must deny the Permit pending receipt of complete information.

Please be assured of our willingness to cooperate with you in every way possible. When the required data is received you may be assured of our prompt attention.

Very truly yours,

ENVIRONMENTAL PROTECTION AGENCY

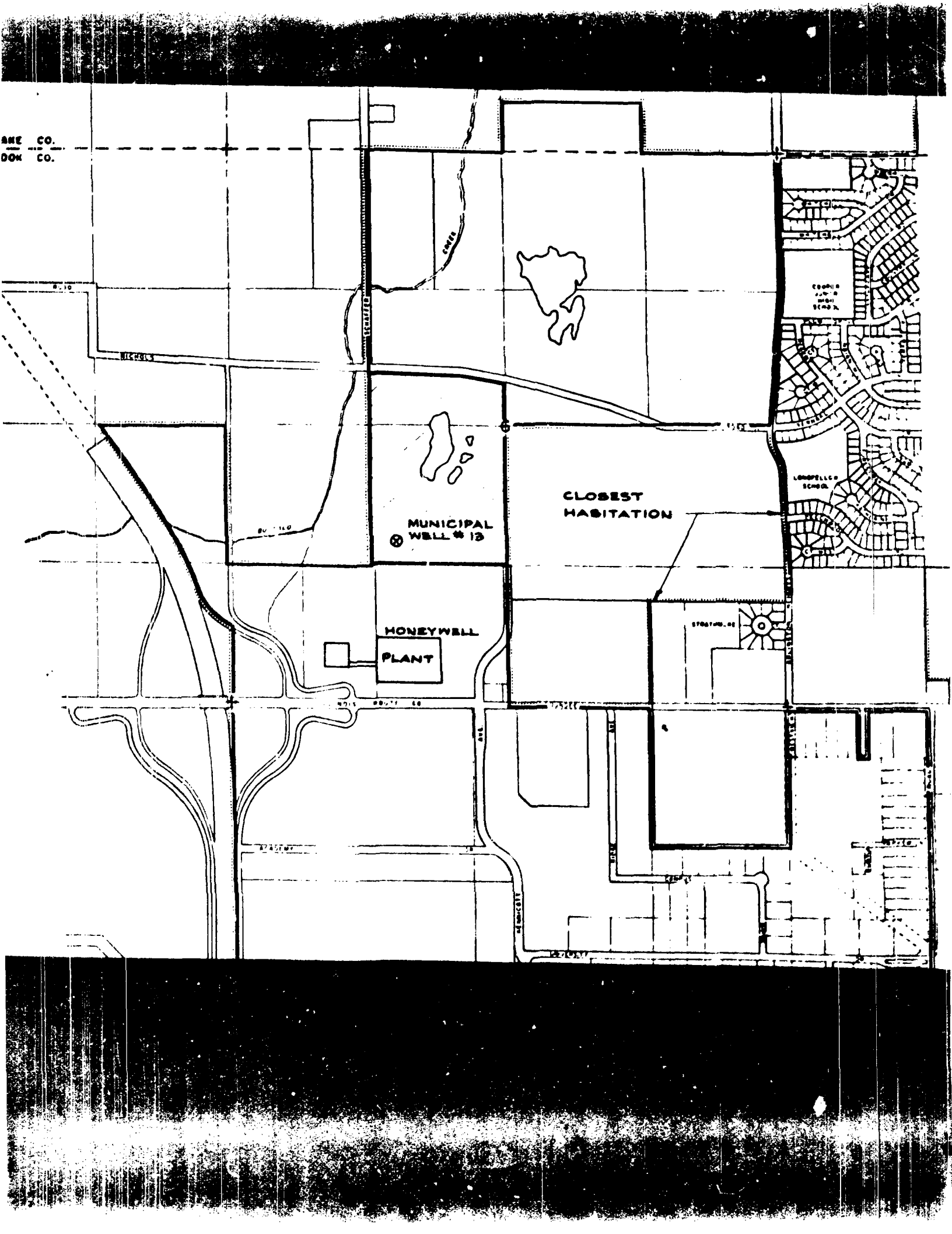
David W. Allman

David W. Allman
Environmental Protection Geologist
Division of Land Pollution Control

DWA/by

cc: Region II

Encl.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